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## Economics of milk production fed different protein supplements of Gir cows during winter season

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### Abstract

A study was carried out on sixteen lactating Gir cows were divided into four groups on basis of nearest their body weight and milk production at Dairy farm (LPM Deptt.) SKNCOA, Jobner (Rajasthan) and subjected to four dietary treatments were formulated. i.e. Wheat straw *ad-lib.*+ Green Lucerne (5 kg) + Concentrate (T<sub>1</sub>), T<sub>1</sub> + Urea fed 75 g/cow (T<sub>2</sub>), T<sub>1</sub> + Mustard oil cake fed 614 g/cow (T<sub>3</sub>) and T<sub>1</sub> + Guar meal fed 505 g/cow (T<sub>4</sub>) and the studied for their economics of milk production fed protein supplements of Gir cows during winter season. Average daily milk production (litre/cow) was significantly (P<0.05) higher in T<sub>4</sub> (7.85 litre) than T<sub>3</sub> (7.13 litre), T<sub>2</sub> (7.05 litre) and T<sub>1</sub> (6.67 litre). Total feed cost/litre of milk was Rs. 29.86, Rs. 24.19, Rs. 28.29 and Rs. 25.98 in T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> groups, respectively. T<sub>4</sub> (Guar meal) group as compared to other groups more economical and best performance. It was found that T<sub>2</sub> (Urea) group is economical but not better effect on milk yield of Gir cow. Total feed cost/litre of milk was Rs. 29.86, Rs. 24.19, Rs. 28.29 and Rs. 25.98 in T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> groups, respectively.

**Keywords:** cost, economic, Gir cow, gross return

### Introduction

Livestock is an integral part of agriculture and plays an important role in contributing to national economy. Total Milk production in the India was 187.7 million tonnes during 2019. India is the world's largest milk producer, with 21 per cent global production. Rajasthan is ranked 2<sup>nd</sup> in India and produces 23.6 million tonnes of milk every year. The distribution of this breed is Gir hills and forest of Kathiawar, Junagadh, Bhavnagar, Rajkot and Amreli districts of Gujarat and also in some parts of Maharashtra and Rajasthan. The body of Gir animals is well proportioned, the head is moderately long but massive in appearance with prominent bony forehead straight and leveled back are the most the marking characters of the breed and body colour is red to white, Udder is well developed and round in Gir cattle. Cattle of this breed are most important for their tolerance to stress conditions and resistant to various tropical diseases. Nutrition plays crucial role in growth, reproduction and production of animals but the biomass resources are very limited and there is shortage of feed and fodder. There is a serious shortage of conventional feed resources. Hence, it is necessary to look for protein rich, nonconventional feed resources. In India there is shortage of 22.5 per cent dry fodder, 62.7 per cent green fodder (IGFRI, 2010) <sup>[4]</sup> and 34 per cent concentrate to meet the requirement of vast bovine population (Mangurkar,1998).The one of the constraint in animal production is scarcity of feeds and fodder in term of quality and quantity. Proper and balance feeding is essential for economic milk production to make dairy farming a successful enterprise because feed cost accounts about 75 per cent of milk production in cattle and buffaloes. The cost per kg milk can be reduced by 60 per cent and 40 per cent, respectively by feeding good quality leguminous and non-leguminous fodder (Upadhyay, 1994) <sup>[8]</sup>. Feeding is one of the most important determinants of profit in the livestock farming. Crop residue chiefly jower straw, corn stover, wheat straw, bajra straw, and other similar types of residues are major component of ruminant ration. These feed resources are very poor in nutrient contents which are even not able to supply the nutrients required for maintaining the animals.

Cattle and other ruminants convert urea to protein through the production of ammonia and carbon dioxide. Urea when used for treatment of straw boost the nutritional quality of straw in terms of increased nitrogen content, enhanced the palatability and digestibility. The composition of mustard cake (MC) varies with the variety, growing conditions and processing methods. The crude protein content varies from 33-40 per cent in mustard cake. Guar Meal used in concentrate rations for lactating dairy cows.

In dairy cattle, Guar meal is a highest protein containing animal feed in its group. It is having upto 50 per cent of protein with a high digesting content. Complete ration not only improves the feeding value of feed stuff but also simplifies feeding, minimizes labour and maximizes automation. The cost of feeding per litre milk production is a significant factor governing the economic viability of livestock sector which must be reduced by adopting new measures in the ration formulation. This leads to search for sources that are also easily available and economically feasible. The expected output from this study will fill the gap of the existing deficiency of knowledge to develop the best feeding strategies to be more economically efficient in dairy production.

### Materials and Methods

This study was conducted on ‘‘Economics of Milk Production Fed Different Protein Supplements of Gir Cows during Winter Season’’. The experiment was carried out at Dairy farm, Department of Livestock Production Management, SKNCOA, Jobner (Jaipur) from 6 December, 2019 to 4 March, 2020 (90 days) under RKVY project Geographically Jobner is located 45.0 km west of Jaipur at 26°05' North latitude, 75°28' East longitude and at an altitude of 427 meter above mean sea level. This area is consisting in dry northern region of India as per quality of livestock which have good milch breed of cattle. The area falls in agro-climatic zone III–A (Semi- arid eastern plain zone of Rajasthan). The cows were selected from the herd of Gir project under RKVY. Sixteen lactating Gir cows in mid stage of lactation were selected for the experiment. The details of treatments of experimental Gir cows are given in (Table 1). They were randomly divided into four groups of four in each group on basis of nearness in their production and body weight of Gir cows. Each group was allotted randomly to the following feeding practices/treatments.

**Table 1:** Details of Treatments.

Treatments	Symbols
Wheat straw <i>ad lib.</i> + 5.0 kg Lucerne + *Concentrate palleted feed	T <sub>1</sub>
T <sub>1</sub> +**Urea @75 g per cow per day	T <sub>2</sub>
T <sub>1</sub> +**Mustard cake @614 g per cow per day	T <sub>3</sub>
T <sub>1</sub> +**Guar meal @505 g per cow per day	T <sub>4</sub>

\* Concentrate palleted feed calculated as per requirement and reduced 1 kg concentrate will be replaced by urea or other supplements according to CP requirement.

\*\* Amount crude protein calculate equilibrium 215 gm CP from 1.25 per cent urea (287.5 g CP) or mustard cake (35 per cent) or Guar meal (42.5 per cent).

### Cost of feeds

Economics of feeding under different treatment was calculated from the records of feed and by considering the procurement cost of feeds and fodder used for feeding of experimental cows. Gross return from sale of milk from

different groups were worked at Department of Livestock Production Management. The cost of Lucerne and wheat straw was Rs. 700/Q and Rs. 890/Q, respectively, which cost of concentrate palleted Rs. 2375/Q Mustard oil cake Rs 3500/Q. Guar meal Rs 3910 and Urea Rs. 1000/Q. The milk was sold to milk window @ Rs. 42/lit. during experiment period.

### Statistical analysis of data

The data obtained was processed to analysis of variance as per standard method (Snedecor and Cochran, 1994).

### Results and Discussion

The data collected during the experimental were subjected to standard methods of statistical analysis and presented in this chapter in the form of tables along with the implications of the results to the economics of milk production fed different protein supplements of Gir cows during winter season under following head.

### Feed cost of milk production

The economic evaluations of feeding the experimental ration and the feed cost per litre milk production was presented in Table 2. Total feed cost was Rs. 70,033.5, Rs. 61,385.6, Rs. 73,618.8, Rs. 73,530.3 in T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub>, respectively. Income for sale of milk is Rs. 101, 085.6, Rs. 106,545.6, Rs. 107,969.4 and Rs. 118,893.6 in T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> groups respectively. Lactation yield (300 days) per cow were calculate is 2007 liter, 2115 liter, 2142 liter and 2358 liter in T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub> groups, respectively. The feed cost per litre milk production was Rs. 29.08, Rs. 24.19, Rs. 28.64 and Rs. 25.98 in T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> and T<sub>4</sub>, respectively.

The feed cost per litre milk production was higher in group T<sub>1</sub> as compared to other groups in Gir cows. The higher Gross return from T<sub>2</sub> and T<sub>4</sub> as compared to T<sub>3</sub> and T<sub>1</sub> groups due to more milk production and lower feed cost as compared to other groups. T<sub>4</sub>, T<sub>2</sub> groups are more economical as compared to T<sub>3</sub> and T<sub>1</sub> groups but urea feeding is not beneficial. Replacing protein sources with cheaper Guar meal resulted in better economic efficiency reported by Mahdevi *et al.* (2010) [5]. Guar meal can be used to substitute other protein sources without any side effect reported by Turki *et al.* 2011. Soliman *et al.* (2014) [7] pointed out the feed cost proved that ration contained 5 per cent Guar korma improved the economic return (L.E. /H/D). The cost of one kg feed for groups feed Guar meal and Cotton Seed cake + Guar meal diet were Rs. 14.48 & Rs. 16.70 and it results that Guar meal based diet was more economical than diet containing Cotton Seed cake + Guar meal investigated by Sharif *et al.* (2014). While the feed cost per litre milk yield was increased with increasing Guar Korma Meal levels reported by Wala *et al.* (2016) [9]. Protein sources are more economical are reported by Boori (2018) [2], Choudhary (2019) [2], but controversy observed by Choudhary *et al.* (2000) [3] in buffaloes.

**Table 2:** Feed cost of milk production under different treatments.

Particulars	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
Total quantity of lucerne green (qtl)	18	18	18	18
Total quantity of wheat straw (qtl)	18.90	18.79	23.72	24.44
Total quantity of concentrate (qtl)	17.1	13.50	13.50	13.50
Mustard cake (qtl)	-	-	2.21	-
Guar meal (qtl)	-	-	-	1.82
Urea (Kg)	-	27	-	-

Feed cost (Rs.)				
Lucerne	12,600	12,600	12,600	12,600
Wheat straw	16,821.00	16,723.1	21,110.8	21,751.6
Concentrate	40,612.5	32,062.5	32,062.5	32,062.5
Mustard cake	-	-	7,845.5	-
Guar meal	-	-	-	7,116.2
Urea	-	270.0	-	-
Total feed cost	70,033.5	61,385.6	73,618.8	73,530.3
Total milk production in 90 days/ 4 cows	2406.8	2536.8	2570.7	2830.8
Total income sale of milk (90 days)	101,085.6	106,545.6	107,969.4	118,893.6
Estimated milk production in (300 days) lactation (litre)/ cow	2007	2115	2142	2358
Milk yield /cow per day (litre)	6.69	7.05	7.14	7.86
Average daily feed cost per animal	194.54	170.52	204.50	204.25
Feed cost /litre of milk	29.08	24.19	28.64	25.98

Cost of items- (as per college rates through tender etc.)

Green lucerne- Rs. 700/qtl Wheat straw- Rs. 890/qtl

Concentrate- Rs. 2375/qtl Mustard cake- Rs. 3550/qtl

Guar meal- Rs. 3910/qtl Urea- Rs. 1000/qtl

Milk rate- Rs. 42/litre

### Conclusion

Therefore, It can be concluded that feeding of Guar meal (T<sub>4</sub>) increased the milk production in Gir cows and feed cost per litre milk was minimum in T<sub>2</sub> (Urea) group but Urea not better perform on milk yield. T<sub>4</sub> (Guar Meal) group was also more economical as well as better perform on milk production of Gir cows during winter season.

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